The tornado cloud was seen emerging out of the National Cemetery and passing by the United States post office and the county courthouse. In its passage through the cemetery it uprooted forty trees, lifted the iron flagstaff, although embedded in solid granite, snapped to pieces the 1-inch wire cable guy of the staff, lifted bodily from its base 500 feet of 12-inch brick wall 4½ feet high, and demolished the keeper's residence. In its passage through vacant property to the principal business street it passed over the residence of Mrs. Mivelaz, the brick walls of which burst outward with a loud explosion, undoubtedly due to the low air-pressure at the center of the tornado; a similar fate befell a frame building. Farther on, and on the left-hand side of the tornado track, a two-story stone building was demolished and a three-story brick building was carried entire 25 feet away from its foundation. Thirty-three persons were killed outright and nineteen subsequently died from their injuries; forty-four others were seriously injured.

As far as can be learned, the tornado descended to the ground first in the mountainous country near San Bois, in the Choctaw Nation, 100 miles southwest of Fort Smith; crossed the Arkansas River three times, viz, at the mouth of Cache Creek, at a point near Fort Smith, at a third point beyond Fort Smith, four miles east of Van Buren. At Belmont in the eastern part of Crawford County, 20 miles northeast of Fort Smith, it was observed ascending and disappearing in the air.

The passage of the tornado cloud was actually observed during about six seconds by the observer at Fort Smith, during which time it traveled about 700 feet, passing in front or south of his office at 12:08 or 12:09 a. m., at which time the extreme wind velocity was 60 miles from the southwest, while the maximum or average velocity during five minutes was 48 miles. The rainfall lasted four minutes, from 12:07 to 12:11 a. m., January 12, and amounted to 0.38, as found in the gauge. At 12:40 a. m. not a cloud remained visible in the sky except a bank of stratus in the western horizon. The directions in which the débris were thrown are given by Mr. O'Donnell in detail. Nearly everything within 300 yards of the central path was thrown from either side toward the center. The only movement that was not frequently shown was from the northwest. The general trend of the central path was almost exactly from west to east, in its passage through the city of Fort Smith. The area of destruction, and apparently the force of the wind, was greater on the south or right-hand side than on the north or left-hand side. The damage to property was very light at distances exceeding 400 feet on the south side and 250 feet on the north side. The total damage to property is estimated at $450,000. The Weather Bureau Observer, standing within the skylight, on the roof of the Observatory, 54 feet above the ground and 450 feet north of the central portion of the track, could see on a level with his eye and higher up, objects flying out of the cloud toward the north and west. The testimony of those who live on either side of the tornado path confirms the conclusion that the precipitation was heavier on the south than on the north side.

The readings of the barometer were: 11th, 8 p. m., 28.846, and the same at midnight. At 12:45 the barometer read 29.010. The lowest pressure, as deduced by correcting the barograph record, was apparently 28.67, but as the barograph clock had unfortunately become disordered a few days before there is no record of the time of this minimum. This depression could not have lasted more than a minute; it occurred in the midst of a general depression of about 0.30 which had continued since 4 p. m. of that date. The collapse of the dwelling of Mrs. Mivelaz, which was about 200 feet south of the center of the path, is the principal evidence of a decidedly sudden local diminution in pressure.

The anemometer record shows that the extreme velocity of 60 miles within a minute also occurred at 12:08 or 12:09.

The corrected thermograph record shows a fall from 73° at midnight to 62° at 12:10 a. m. of the 12th, but this fall may easily have been due to the wetting of the dry bulb by reason of the high winds at that moment. On the other hand, this may also represent the lower temperature of the rain and vapor within the cloud, a few hundred feet north of the central tornado. Some of the débris from the tornado seems to have been found the next day at Ozark, Ark., 30 or 35 miles distant, toward the east-northeast. Another tornado occurred an hour previous, i. e., at 11 p. m. of January 11, at Alma, Crawford Co., Ark., 20 miles northeast of Fort Smith.

NOTES BY THE EDITOR.

MOUNTAIN STORMS.

A correspondent, Mr. L. D. Woodfill, Highhouse, Fayette Co., Pa., asks the following questions. Any information will be thankfully received:

In this part of the country, near Uniontown, Pa., we always hear a loud roaring, as of great winds, from six to twelve or sixteen hours preceding a mountain storm. During this roaring, which appears to be in the mountain, 6 miles off, it is almost a perfect calm here. What is the cause? I am told that this phenomena only occurs in the southwest part of Fayette Co., Pa.

DR. WALTEMATH'S MOON.

A circular letter addressed to the Editor of the MONTHLY WEATHER REVIEW by Dr. George Waltemath of Hamburg, requested that observations be made on February 3 for the purpose of discovering whether or no any small, round, black spot could be seen crossing over the sun's disk, corresponding to the hypothetical small moon or large meteoric body which Dr. Waltemath thinks must exist, circulating around the earth in about one hundred and seventy-seven days or a little less than six months. Although there could be no rational expectation of the existence of such a body, yet, as the observations were easy to make and would afford an absolute confirmation or refutation of this new theory, the Editor requested Professor Bigelow to allow the use of his 4-inch telescope, for the purpose of the search. The same glass had been used by Mr. R. H. Dean in observing the transit of Mercury, November 10, 1894, when, as now, it was arranged so as to cast a well-defined image of the sun about 5 inches in diameter, upon a sheet of white paper, at the rear of a photographic camera box. The definition was sufficiently clear to allow an object, whose apparent diameter is 5 seconds of arc, to be distinctly seen. In addition to cursory observations by Professor Bigelow and the Editor, a more careful examination was made at 12 noon, 1, 2, 3, and 4 p. m., by Mr. Dean. The day was clear and the atmosphere very favorable but no sunspots or other objects were seen on the projected image of the sun.

With regard to the corresponding observations of the transit of Mercury, November 10, 1894, Mr. Dean had at that time reported—

The first appearance of the image as a clearly defined black spot on the west limb of the sun's projected image was at 10h. 57m. 50s., seventy-fifth meridian mean time. The entire image was visible at 10h. 59m. 0s. At the close of the transit there was no light between the edge of Mercury and the edge of the sun at 4h. 9m. 15s., but it wavered until 4h. 10m. 0s., when the two edges were clearly in contact

and so remained until 4h. 10m. 50s., when a cloud obscured the image and prevented further observation. The times were carefully determined by comparison with the noon signal on the Navy Department building which can be seen from the Weather Bureau building.

As the diameter of Mercury during its transit in 1894 was about 10 seconds, and as no spot was seen by Mr. Dean on February 3, 1898, we must infer that the small moon required by Waltemath's theory does not exist.

Dr. Waltemath states that:

One hundred and six anomalistic rotations of the new satellite are almost exactly equal to the 35-year period in climatic changes established by Professor Bruckner, and that, therefore, the existence of this satellite may have an especial interest to meteorologists.

On this point the Editor must differ with him inasmuch as we can not see any reason why either the small hypothetical or the large and actual satellite of the earth should have any appreciable influence, at the present time, upon our meteorology.

RECENT EARTHQUAKES.

December 29, 6h 32m 43s a. m., Port au Prince, Hayti, W. I. Prof. T. Scherer reports as follows:

A severe earthquake was experienced at Port au Prince lasting one minute and thirty-one seconds. The following are the conclusions to be drawn from the curves traced by the Secchi seismograph at the meteorological observatory of the College of St. Martial.

The entire phenomenon consisted of five consecutive shocks, the total duration of which was forty-eight seconds, and of a series of feeble movements very perceptible to an attentive observer. The first shock lasted eight seconds, it began from east-northeast and ended from west-southwest. The vertical component was quite strong at about the fifth second. The movement immediately began with more force in the horizontal direction and less in the vertical; this lasted eleven seconds, and the direction from which it came was more toward the east. The third shock lasted three seconds, and was characterized by a very regular oscillatory movement. The fifth shock was the strongest, lasted ten seconds, began from the northeast, and died away in the southwest, with a vertical component that was scarcely appreciable. All the other movements, after the forty-eighth second, were feeble, with the same horizontal direction. During all this time the seismic pendulum described ellipses in the sand whose major axes varied from northeast through the south to southwest. The Bertelli microseismometer was for a long time agitated and finally maintained a north-south direction.

The same earthquake was felt in the neighborhood of Port au Prince and with the same features. It seems to have been very violent in the interior of the island of Dominica.

January 1, 5:15 a. m., Peachland, Cal., earthquake, vibration east and west; duration, 2 to 3 seconds.

11th, Lakeside, Wash., slight shocks of earthquake.

13th, Laramie, Wyo., slight shock of earthquake about midnight, duration about fifteen seconds.

14th, Lakeside, Wash., slight shocks of earthquake.

15th, Lakeside, Wash., slight shocks of earthquake.

26th, Helena, Ark., 7:35 p. m., slight earthquake, no serious damage.

Prof. Edward W. Morley, of Adelbert College, Cleveland, Ohio, and Prof. C. F. Martin, of the Weather Bureau at Washington, report that no earthquakes disturbed their respective seismographs during January.

THUNDERSTORMS IN CALIFORNIA.

Mr. Barwick has called the attention of the Editor to an article on the above subject that had been overlooked by him in preparing his notes for the MONTHLY WEATHER REVIEW for December, 1897, page 539. This article is by Mr. John D. Parker, and calls attention to the infrequency of thunderstorms in southern California. (See the American Meteorological Journal, June, 1895, Vol. XII, page 51.) Among other things, Mr. Parker says:

The Weather Bureau has reported only two electrical storms at San Diego during the past sixteen years. One of these occurred on August 27, 1894, and it may be taken as a type of all the electrical storms in this region. On that day there prevailed a close, sultry atmosphere, with a stoppage of the sea breeze, replaced by fitful currents of hot air from the desert, and a filmy vapor cast a slight veil over the face of the sun. About midday the observer at San Diego, from the roof of his building, saw far to the south fifteen or twenty very small thunderheads, appearing conical above, with flat bases. These thunderheads moved slowly northward along the San Jacinto mountain range, and arrived opposite San Diego about sunset, where, by the enlargement of the visual angle, they seemed to fill the whole heavens with black masses of cloud. The edge of this Sonora brushed by San Diego that evening, with an electrical display which was quite vivid in the mountains.

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Lightning sometimes plays a little among the clouds far out over the ocean, and occasionally thunder mutters in the mountains, but the Weather Bureau reports that during the last sixteen years not a single thunderstorm arising from general cyclonic action has occurred at San Diego. The thunderstorms of this region are Sonoras, that move northward two or three times a year from Sonora and contiguous regions, where they originate. They seem to be formed, like ordinary thunderstorms, from vapors evaporated from the Gulf of California and regions lying adjacent, and, moving northward along the San Jacinto Range on both sides of the mountains, exhibit electrical displays until their forces are exhausted and they are dissipated.

The explanatory hypotheses suggested by Mr. Parker in the rest of his article are suggestive and interesting, but need a further elaboration before arriving at a satisfactory solution of the problem.

SNOW ROLLERS.

Mr. T. B. Jennings, section director, in his report of the Kansas section for January, says:

A decidedly unusual phenomenon occurred in Saline County during the snowstorm on the 14th, which would indicate that the conditions which produce hailstorms in warm weather may prevail in cold weather, the temperature for the day ranging between 34° and 25°. Over a narrow belt about 12 miles long, extending from southeast of Bavaria to north of the Saline River, late that evening, a fall of snowballs occurred, ranging "from the size of baseballs to half-bushel measures." They do not seem to have been hard, yet they were still to be seen scattered about the fields by persons who went out the next Sunday, the 16th, to view them.

As freshly fallen snow is often rolled into balls and cylinders by a gentle wind, we presume that the balls in Saline County may have been a case of "snow rollers."

BRIGHT METEORS.

Notices in the daily press have been published with regard to a bright meteor observed at 1 p. m. at San Jose, Cal., by Mr. Paddington of the Lick Observatory. It was seen in the west at an elevation of about 8° above the horizon, moving rapidly toward the north in a path slightly inclined toward the earth. It increased in brightness along its course and disappeared suddenly in a clear sky.

Reports of a great meteor seen at Dubois, near Boise City, Idaho, about January 25, have been received, but no reliable details are given.

NOTES FROM THE REPORTS OF STATE SECTIONS.

MONTANA.

Mr. Walter A. Clark, of Choteau, Mont., proposes to experiment with the box kite for carrying up the cold wave, or norther, flag signal.

The Secretary of Agriculture has directed that the voluntary observers and the Climate and Crop correspondents of the Weather Bureau, be included among those to receive the seeds gratuitously distributed by the Department.

Mr. Coe, of Kipp, Mont., says: "Probably there is no locality in the Western States where the chinook phenomena are so prettily illustrated